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**PHOSPHOROUS ACID, TRIPHENYL ESTER, REACTION  
PRODUCTS WITH DIPROPYLENE GLYCOL  
(CAS NO. 116265-68-0):  
TEST PLAN**

**Submitted to the US Environmental Protection Agency**

**By**

**Chemtura Corporation**

**DATE: December 21, 2005**

## **SUMMARY**

Chemtura Corporation (Chemtura) has sponsored Phosphorous acid, triphenyl ester, reaction products with dipropylene Glycol (CAS No. 116265-68-0) under the EPA's High Production Volume (HPV) Program. This document provides the Test Plan and summaries of existing data for this substance.

## 1.0 INTRODUCTION

Chemtura has voluntarily committed to participate in the Environmental Protection Agency's (EPA) high production volume chemicals (HPV) challenge program (program), to assess the health and environmental hazards, including selected physical chemical characteristics of Phosphorous acid, triphenyl ester, reaction products with dipropylene glycol (CAS No. 116265-68-0). This substance is represented by a second CAS No.; 36788-39-3, 3,6,8,11-Tetraoxa-7-phosphatridecane-1,13-diol, 7-[2-(2-hydroxymethyl ethoxy)methylethoxy]tetramethyl-. These two CAS No. are the same substance, and data from either substance represents the sponsored substance.

An evaluation of the available data and proposed test plan are included in this document. Robust summaries are attached in Appendix 1.

The objective of this test plan is to evaluate the available data and determine what additional data, if any, are needed to adequately characterize the physical properties, environmental fate, and human health and environmental hazards of Phosphorous acid, triphenyl ester, reaction products with dipropylene glycol (CAS No. 116265-68-0). It is proposed that additional studies be conducted as shown in Table 1.

**Table 1: PROPOSED TESTING FOR PHOSPHOROUS ACID, TRIPHENYL ESTER, REACTION PRODUCTS WITH DIPROPYLENE GLYCOL (CAS NO. 116265-68-0)**

Endpoint	Data
Physical Chemical Properties	
Melting Point	A
Vapor Pressure	A
Boiling Point	A
Partition Coefficient	A
Water Solubility	Test
Environmental Fate	
Hydrolysis	Test
Photodegradation	A
Biodegradation	Test
Environmental Transport	A
Ecotoxicity	
Acute Fish	Test
Acute Daphnia	Test
Acute Algae	Test
Mammalian toxicity	
Acute Oral	A
Acute Dermal	A
Acute Inhalation	A
Repeated Dose	Test
Genotoxicity ( <i>in vitro</i> -bacteria)	Test
Genotoxicity ( <i>in vivo</i> )	Test
Reproductive/Developmental	Test

A = Adequate data

Test = Testing proposed

## 2.0 POTENTIAL USE AND EXPOSURE

The sponsored substance is one of several related phosphite materials used as a secondary antioxidant in polyolefins, ABS, synthetic rubber, PVC, epoxies, polyurethanes, polyesters, adhesives and other polymers to improve color, processing, heat and UV stability. Some typical applications include polyethylene films, refrigerator liners and vinyl flooring. Materials of this type are also used in lubrication additives.

## 3.0 EVALUATION OF EXISTING DATA AND PROPOSED TESTING

The available data have been assessed (see Tables 2 through 4). Robust summaries are provided as Appendix 1.

### Chemical/Physical Properties:

The vapor pressure of the sponsored substance is 1.3-13.3 hPa (Crompton, 2003). The physical chemical properties of the substance were calculated using EPIWIN (see Appendix 2). Based on calculated data, the sponsored substance is expected to have a high water solubility and low partition coefficient. However, the substance is expected to be insoluble (Crompton, 2003), such that a water solubility test is proposed.

**TABLE 2: PHYSICAL CHEMICAL PROPERTIES FOR  
PHOSPHOROUS ACID, TRIPHENYL ESTER, REACTION PRODUCTS WITH  
DIPROPYLENE GLYCOL (CAS NO. 116265-68-0)**

Endpoint	CAS NO. 116265-68-0
Melting Point	187 C
Vapor Pressure	1.3-13.4 hPa
Boiling Point	484 C
Partition Coefficient	-1.56
Water Solubility	Insoluble

**Recommendation:** A water solubility test (OECD 105) is proposed.

### Environmental Fate:

Environmental fate data are not available for the sponsored substance. EPIWIN was used to predict the photodegradation and environmental distribution (see Appendix 2). The Overall OH Rate Constant =  $200.6758 \text{ E-12 cm}^3/\text{molecule-sec}$  and the predicted half-life = 0.053 days. Level III fugacity modeling distribution to water and soil will predominate. Although it is expected that hydrolysis of the sponsored substance will be slow, testing is proposed in order to clarify the hydrolysis rate. Biodegradation of the sponsored substance is not available; a biodegradation study is proposed.

**Recommendation:** A hydrolysis test (OECD 111) and a biodegradation test (OECD 301) are proposed.

**TABLE 3: ENVIRONMENTAL FATE DATA FOR  
PHOSPHOROUS ACID, TRIPHENYL ESTER, REACTION PRODUCTS WITH  
DIPROPYLENE GLYCOL (CAS NO. 116265-68-0)**

Endpoint	CAS NO. 116265-68-0
Hydrolysis	Slow
Photodegradation	Overall OH Rate Constant = 200.6758 E-12 cm <sup>3</sup> /molecule-sec Half-Life = 0.053 Days
Biodegradation	Not available
Environmental Transport (Level III Fugacity modeling)	Air 4.36x10 <sup>-10</sup> Water 49.8 Soil 50.1 Sediment 0.0918

**Recommendation:** A hydrolysis test (OECD 111) and biodegradation study (OECD 301) are proposed.

**Aquatic Toxicity**

Acute aquatic toxicity data are not available for fish, daphnia or algae for the sponsored substance.

**Recommendation:** Acute aquatic toxicity studies with fish, daphnia and algae (OECD 203, 202, and 201) are proposed.

**Acute Mammalian Toxicity**

Acute oral, dermal and inhalation studies have been conducted (Crompton, 2003). The data indicate low toxicity by all routes of exposure.

**Recommendation:** No additional testing is proposed.

**Repeated Dose/ Reproductive/Developmental Toxicity**

No data are available regarding the repeated dose toxicity, reproductive toxicity or developmental effects of the sponsored substance or structurally related substances.

**Recommendation:** A combined repeat dose with developmental and reproductive screen (OECD 422) is proposed.

**Mutagenicity Assays**

No data were located for in vitro or in vivo mutagenicity.

**Recommendation:** Bacterial (OECD 471) and in vitro mammalian mutagenicity (OECD 473) studies are proposed.

**TABLE 4: MAMMALIAN TOXICITY DATA FOR  
PHOSPHOROUS ACID, TRIPHENYL ESTER, REACTION PRODUCTS WITH  
DIPROPYLENE GLYCOL (CAS NO. 116265-68-0)**

<b>Endpoint</b>	<b>CAS NO. 116265-68-0</b>
Acute Oral	>10,000 mg/kg (rat)
Acute Dermal	>2000 mg/kg (rabbit)
Acute Inhalation	>2 mg/L (rat)
Repeated Dose	Not available
Genotoxicity ( <i>in vitro</i> - bacteria)	Not available
Genotoxicity ( <i>in vivo</i> )	Not available
Reproductive/Developmental	Not available

#### **REFERENCES**

Crompton (2003) Material Safety Data Sheet, Weston 430. Revision 1.2; 10/15/2003

EPI-SUMMARY (v3.11)